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Mary E. Landergan
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July 8, 1992

HAND DELIVER

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, DC 20554

Dear Ms. Searcy:

On behalf of Capital Cities/ABC, Inc., transmitted herewith for filing with the Commission are an original and five copies of Reply Comments in ET Docket No. 92-9.

If there are any questions in connection with the foregoing, please contact the undersigned.

Sincerely yours,

Mary E. Landergan

Mary E. Landergan

MEL/ak
Enclosures

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies	)	ET Docket No. 92-9

REPLY COMMENTS OF CAPITAL CITIES/ABC, INC.

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To: The Commission

REPLY COMMENTS OF CAPITAL CITIES/ABC, INC.

Capital Cities/ABC, Inc. ("Capital Cities/ABC") submits herewith its Reply Comments in response to the Comments of Communications Satellite Corporation ("COMSAT") and Motorola Inc. ("Motorola").

In its Notice of Proposed Rule Making, the Commission wisely decided that relocation of broadcast auxiliary services should not be pursued. Although COMSAT appears to accept this judgment, COMSAT's comments propose spectrum sharing with the broadcast auxiliary service as an alternative to relocation. We oppose this proposal.

The spectrum sharing proposed by COMSAT is not feasible. Such spectrum sharing would disrupt broadcasters' access to broadcast auxiliary services for news and sports programming. The resulting interference risk would in large

part be borne by broadcasters. COMSAT's suggestion that the Commission eliminate access of electronic newsgathering operations to BAS 2GHz channel 1 would similarly disrupt news and sports programming. The attached Engineering Statement of Kenneth J. Brown ("Brown Statement") sets forth in detail the reasons why COMSAT's proposal would result in extremely damaging effects on television news and sports programming.

In its comments, Motorola supports relocation of the broadcast auxiliary services contrary to the Commission's position. Although our initial comments set forth sufficient reasons Motorola's arguments should be rejected, we herein would like to address one additional point raised in Motorola's comments concerning the occupied bandwidth of the video signal.

Motorola incorrectly claims that broadcasters do not need the amount of bandwidth currently allocated to them. As the Brown Statement makes clear, broadcasters do and will continue to need, at a minimum, the bandwidth presently allocated to them for important broadcasting purposes.

Conclusion

We recommend that the Commission reject COMSAT's proposal for spectrum sharing because of the disastrous effect such sharing would have on the dissemination of news and sports programming. In addition, we recommend that the Commission reject Motorola's arguments favoring relocation of the broadcast auxiliary services.

Respectfully submitted,

By: Mary E. Landergan

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July 8, 1992

ENGINEERING STATEMENT OF KENNETH J. BROWN
IN CONNECTION WITH
REPLY COMMENTS OF CAPITAL CITIES/ABC, INC.
REDEVELOPMENT OF SPECTRUM TO ENCOURAGE INNOVATION IN THE USE OF NEW TELECOMMUNICATIONS TECHNOLOGIES
ET DOCKET 92-9

I am Manager of Allocations and Licensing for the American Broadcasting Companies, Inc., a wholly-owned subsidiary of Capital Cities/ABC, Inc., with offices located in New York City. My education and experience are a matter of record with the Federal Communications Commission.

This statement has been prepared for filing in connection with the Reply Comments of Capital Cities/ABC, Inc., in response to the FCC's Notice of Proposed Rule Making (NPRM) in the above-captioned proceeding.

I. Response to Comments of COMSAT

The Comments filed by Communications Satellite Corporation (COMSAT) in this proceeding ask the Commission to allocate in the US spectrum which was selected at WARC 92 for satellite operations, despite the fact that part of this spectrum is unsuitable for the purpose in the US due to prior occupancy by the Broadcast Auxiliary Service (BAS), which the Commission has wisely decided cannot be relocated. COMSAT seeks to overcome this obstacle by recommending spectrum sharing, and attaches a study which purports to show that sharing is practical. The study, however, is seriously flawed, and sharing of spectrum as proposed by COMSAT would result in intolerable interference to television news and sports programming nationwide. COMSAT also suggests that the Commission simply cease to allow television electronic news gathering (ENG) operations on BAS 2 GHz channel 1 if sharing is in fact a problem, as though such a request would have no adverse consequences. In fact, such a restriction would reduce the amount and/or immediacy of timely news and sports programming available to the American public, as well as disrupt some of the advanced mobile technologies, such as point-of-view camera shots, to which the public has already become accustomed.

A. BAS Spectrum Scarcity

As COMSAT recognizes, there are only seven full channels of BAS 2 GHz microwave, between 1990 and 2110 MHz. Its proposal seeks to encumber 20 MHz of this limited spectrum, from 1990 to 2010 MHz, for earth-to-space operations. COMSAT claims that this actually impacts only the lowest one BAS 2 GHz channel and requests that the Commission standardize the carrier frequency

of BAS systems operating in this one channel so COMSAT can introduce notch filters into satellite receivers for their protection. In fact, congestion is so serious and sharing so prevalent in the BAS 2 GHz spectrum, that split-channel and offset channel operations are now utilized where necessary and possible, to maximize the use of this irreplaceable resource. Carrier frequencies may, accordingly, be operated on center channel (1999, 2016.5, etc.), lower offsets (1994.75, 2012.25, etc.), upper offsets (2003.25, 2020.75, etc.), or occasionally, both offsets, with cross-polarization, reduced deviation, and extra filtering or geographically separated receiver sites. If split and offset channel operation were rendered impossible in the lowest two channels because of sharing restrictions, then an allocation of at least two more unshared 17 MHz channels of video microwave BAS 2 GHz spectrum is necessary immediately, and difficulties would still occur where offsets have been utilized to create guard bands -- such as for microwave relays. Of course, such a reallocation is not reasonable for the same reasons that reallocation of the rest of the BAS 2 GHz band is not reasonable. The two (formerly three) channels between 2450 and 2483.5 (formerly 2500) MHz are not adequate for the purpose since they are secondary and subject to interference from ISM. COMSAT also is aware only of aural subcarrier operation at 4.83 MHz, when 6.2 MHz and 6.8 MHz subcarriers are also commonly used.

B. Interference to INMARSAT from BAS

COMSAT's spectrum sharing proposal would be beneficial for COMSAT but disastrous for the broadcast (and cable) industry because the interference risk would be borne mostly by broadcasters. COMSAT characterized BAS operations with 12 watt transmitters and high gain antennas, which is the worst interference case to the satellite. COMSAT ignored the point-of-view and relay operations which tend to use transmitter powers of 2 watts and antenna gains of 6-8 dB to achieve battery operation and wide angle reception from moving cameras. COMSAT requests that broadcasters not aim at the geostationary arc, which is unlikely to occur (with high power) unless such an angle were particularly necessary, in which case broadcasters believe the news value to millions of television viewers overrides the relative unimportance of mobile satellite telephone calls during the relatively brief duration of the news coverage. COMSAT requests that a dispersal signal be introduced into BAS transmissions to avoid the emission of pure carrier, when in fact the transmission of "dead" carrier from an ENG unit is an indication of something seriously wrong to be fixed immediately. Furthermore, the only dispersal signal currently available (pre-HDTV) is "black picture" -- NTSC raster -- since

this signal must be transmitted occasionally during or bracketing video segments. For our own purposes, during set-up and between video segments, color bars with station identification are generally transmitted. Any other "dispersal" signal would be prohibitively expensive, due to the vast number of transmitters and receivers which would have to be modified (miniature "point of view" units probably could not be modified and would have to be replaced entirely).

C. Interference to BAS From INMARSAT

COMSAT has completely ignored the most serious mechanisms by which interference could be caused by extremely portable earth terminals to millions of television viewers. We refer COMSAT to the Comments of Capital Cities/ABC in this proceeding as a primer on some of the many ways in which actual usage of BAS 2 GHz spectrum differs from the simplistic model COMSAT assumed for its study. It has already been mentioned herein that BAS power levels are not always high. It should also be known that receive sites are not all clustered in major cities. In fact, permanent receive sites may be scattered around the fringe of a major city where needed for relay of suburban news stories. Temporary receive sites may be located wherever a major mobile operation needs to be temporarily located for broadcast of a news or sporting event, such as at a satellite news truck. Occasionally, such facilities are used for entertainment programming as well. In short, there is no location which is guaranteed "safe" for the use of a portable satellite earth terminal in BAS spectrum. Worse, when relay of pictures from moving cameras on the ground or in moving vehicles is required, it must most often be accomplished by use of a relay helicopter, which receives the signal from the moving camera and retransmits to a fixed reception site. Such a helicopter-based receiver could fly directly over a person attempting to make a satellite telephone call and have its receiver overloaded or captured by the earth terminal signal.

It is not acceptable to claim that earth terminals usage in BAS spectrum would be restricted to rural areas even if all BAS 2 GHz receivers were restricted to metro areas. It is an axiom that anything which can be used also can be misused, and most likely will. Some of our people still report observing cellphone usage occurring from airplanes and other high places. It would only take one careless or cavalier operator to not seek proper metro area telephone facilities, to fire up his earth terminal in the wrong place, to disrupt a television signal of importance to millions of viewers. COMSAT has no way of knowing exactly where a portable INMARSAT earth terminal is when accessing a satellite, and the broadcaster would have no way of

knowing where the disruptor is. Triangulation is an excessively slow process when the immediacy of live programing is involved, and we know of no way to shut off transmissions of an earth terminal other than to first identify or locate the terminal. During the recent earthquake activity east of Los Angeles, when cellphone and terrestrial telephone circuits filled up, we know that persons with INMARSAT access promptly turned to that for communications, despite the cost. But the masses turned to the electronic media for information and reassurance. To create an allocation enabling a privileged few to disrupt service to society at large would not be effective public policy.

D. Relative BAS and INMARSAT Spectrum Requirements

One showing COMSAT has not even attempted to make is why there should be need for such vast amounts of mobile satellite communications service that spectrum which is the backbone of live television production for both broadcast and cable services must be disrupted. COMSAT has, after all, requested a total of 80 MHz of new spectrum -- both the world and Region II blocks -- in addition to what it already has. COMSAT does speak of rural needs, but rural needs are, by definition, nonintensive. When a rare event occurs, such as an earthquake or a major forest fire, to attract many people with communications needs, such event also generally constitutes breaking news of interest to millions of television viewers, which must be served by the small slice of spectrum known as BAS 2 GHz, as already discussed. To attempt to juggle operations among various users of BAS 2 GHz channels ad hoc disrupts sharing plans spread over adjacent major metro areas -- while it can be and is done when necessary, it requires extra time, people, and expense, none of which are generally available during an unplanned emergency. COMSAT admits it is now beginning to explore frequency re-use and narrower occupied channel bandwidths. These changes will greatly increase their spectrum efficiency without needing to take additional spectrum away from us. COMSAT does have existing spectrum, plus it can use half of the new uplink spectrum it has requested without disrupting BAS; broadcasters and cablecasters have no other comparable spectrum available.

II. Response to Comments of Motorola

Motorola's comments recommend that "the Commission also vigorously pursue the 1990-2110" MHz BAS spectrum (Comments of Motorola Inc., p. 3). This is no surprise, given Motorola's history of participation in attempts to obtain Broadcast spectrum for Land Mobile usage, such as the HDTV proceeding. But the statements made by Motorola in support of their position (pages 8-9) are just plain wrong. We refer Motorola to our

Comments in this proceeding, in which most of Motorola's points are more than adequately addressed.

The one Motorola charge not already refuted is the occupied channel bandwidth issue. Motorola states, "This band is divided into one 18 MHz and six 17 MHz channels, each supporting a signal for television transmissions only 6 MHz wide" (p. 8), in an obvious attempt to label broadcasters as spectrum hogs. This characterization is both false and inappropriate.

Baseband NTSC video occupies at least 4.2 MHz of spectrum. Presence of the higher frequencies in the original video signal is necessary to prevent loss of picture detail during processing and transmission. Subcarriers are commonly placed, as already stated, at 4.83, 6.2, and/or 6.8 MHz, depending on how many subcarriers are needed and, particularly for signals which will be distributed through a network, how much degradation of the video can be tolerated. The only way (without extensive digital processing) to transmit this much baseband signal in a channel 6 MHz wide is to utilize vestigial sideband AM transmission, the system used for final broadcast of signal to the home. But the logistics of acquiring signals under field conditions are far harsher than those prevailing for final distribution from fixed transmitters at chosen broadcast sites to home receivers, and degradation of the original signal impacts the entire final product. ABC experimented with VSB-AM transmission for point-of-view use before the Calgary Olympics. As detailed in the attached Engineering Statement of Gary Nadler, which was originally prepared for an Ex Parte filing dated October 20, 1989 in MM Docket 85-36, the VSB-AM signal is far too fragile for field use. FM Video such as successfully used in the field requires a wider bandwidth for some level of protection against noise and multipath interference.

Motorola certainly is aware of the FM advantages, since Motorola manufactures a wide selection of communications radios which utilize F3 modulation. But Motorola communications radios transmit under 4 KHz of baseband audio (+1/-3 dB to 3 KHz) in 15 KHz of occupied bandwidth (+/- 5 KHz swing with 2 1/2 KHz guardbands each side) using channels typically allocated 20 KHz wide. This spectrum utilization compares quite unfavorably to our roughly 6 MHz of baseband in 17 MHz of occupied spectrum, let alone the just over 8 MHz of occupied spectrum we manage in half-channel operation under advantageous conditions.

DATED: July 7, 1992

Kenneth J. Brown

ABC BROADCAST OPERATIONS & ENGINEERING
47 West 66th Street New York, New York 10023-6290 (212) 887-7777

Engineering Statement of Gary Nadler
in connection with
AM-VSB Equipment for Point-of-View RF Cameras

I am an RF Systems Engineer for the American Broadcasting Companies, Inc., a wholly-owned subsidiary of Capital Cities/ABC, with offices located in New York City. I was assigned as Director of RF for the 1988 Winter Olympics in Calgary. I have been an RF Engineer with ABC for 10 years. I have an Engineering degree from the College of Staten Island, N.Y. and have had much experience in the use of miniature microwave equipment for point of view uses.

Prior to the '88 Winter Olympics, ABC had a couple of opportunities to test miniature LPTV transmitters as discussed in FCC Docket No. 85-36. ABC Sports had requirements for live transmission from small "point of view" cameras, to be integrated into an overall live show transmitted back to the States. Similar requirements arise frequently during domestic productions. The first test made was to set up the transmitter and camera on a hockey net. The surrounding environment of the transmitter/receiver was a concrete and steel enclosed stadium. A standard home receiver/demod was used. No favorable results were achieved; multipath was the main problem. Various power levels were tried, to no avail. The project was eventually dropped.

The second test was to set up the transmitter and camera on a down-hill skier. The receive location was approximately 2 miles away. The 5 watt PA was used on the transmitter and a high gain Yagi antenna was used on the receive site. The surrounding terrain was mountaneous. The resulting picture quality was poor. When power was reduced, there was not enough signal. When power was increased, multipath became objectionable. There was no middle ground. A directional antenna on the transmitter might have helped, but it would have been impractically large. We replaced the LPTV transmitter with a small 2GHz transmitter and high quality ENG pictures were received. The higher microwave frequency enabled the use of a directional antenna on the transmitter and a narrower beamwidth receive antenna, both of which greatly reduce multipath. There may also have been benefits realized from FM as opposed to VSB-AM modulation and possible lower multipath propagation due to the higher frequency.

My experience with the miniature LPTV transmitter for point of view was unfavorable. It appears that miniature microwave transmitters give a more reliable and higher quality picture. It is my opinion that the AM-VSB equipment would be better suited for beauty/scenic type cameras, where in all likelihood a larger, more directive type antenna could be employed. However, considerable work would need to be done to reduce the multipath conditions.

Dated: Oct 17, 1988

Gary Nadler

STATE OF NEW YORK)
) SS
COUNTY OF NEW YORK)

I, Gary Nadler, being first duly sworn, upon oath depose and say that the facts contained in the foregoing statement by me subscribed are true of my own personal knowledge except for those facts pertaining to matters of which official notice may be taken or appearing in recognized reliable sources for such facts, and these facts I verily believe to be true.

Gary Nadler

Subscribed and sworn to before me this 17th day of October, 1989

Notary Public

My commission Expires:

MARIAN E. LINDBERG
Notary Public, State of New York
No. 4859631
Qualified in Nassau County
Commission Expires April 21, 1988

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